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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/733,272	12/12/2003	Chia-Shang Chen	BHT-3183-62	8248

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TROXELL LAW OFFICE PLLC
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FALLS CHURCH, VA 22041

EXAMINER

DEO, DUY VU NGUYEN

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 02/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/733,272	CHEN ET AL.	
	Examiner	Art Unit	
	DuyVu n. Deo	1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 November 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-9 and 11-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-9 and 11-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 4, 5, 9, 12, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kang et al. (US 6,582,616).

Kang describes a method for forming a BGA comprising: providing a CCL board (claimed substrate) having a top and bottom surface, the top surface including a die-cavity region; forming a plurality of linear slots, which would have a plurality of sidewalls, around the die-cavity region to form a die-cavity portion integrally connected with the substrate within the die-cavity region; forming a metal copper film on the substrate and inside the slots, etching the metal copper film on the top surface to form a circuit pattern while the metal inside the slot is protected from being etched; removing the die-cavity region to form an inner hole (this would connect the slots in manner that the die-cavity portion is separated from the substrate (fig. 4; col. 6, line 28-35).

Kang, as described above, is silent about forming, patterning an anti-etching layer on the metal layer, and etching the metal layer using the anti-etching layer as a mask to prevent the metal layer on the sidewalls of the through slot from etched. However, Kang describes a series of step including exposure, developing, and etching to form a circuit and figure 4 shows the

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metal layer 20 on the sidewalls of the slots are not etched. Therefore, an anti-etching layer must be used so that the metal layer can be patterned on the substrate and protected on the sidewalls from being etched (claimed forming the anti-etching layer on the top, bottom surfaces and die-cavity portion hermetically sealing the slot) as shown in figure 4 by Kang. Figure 4 also shows that the anti-etching layer must be removed after being etched.

Referring to the limitation that the anti-etching layer is a photosensitive dry film, in another embodiment, Kang teaches using epoxy resin or dry film resist (this would read on claimed photosensitive dry film) for sealing the slots and as a mask for etching the metal layer (fig. 9; col. 7, line 63-col. 8, line 5).

3. Claims 3, 6-8, 11, 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kang.

Unlike claimed invention, Kang doesn't describe the slots are L-shaped slots or the slots having a width between 0.1-4.0 mm. However, at the time of the invention, using any shape of the slots would be obvious and the slots width would have to be determined through routine experimentation to obtain optimum width to form an inner hole with a reasonable expectation of success.

Referring to claims 7, 8, 15, and 16, forming an insulating layer and a surface treating layer on the circuit pattern or metal layer are well known steps to one skilled in the art during the fabrication of BGA (please see cited art below).

4. Kalidas et al. (US 6,084,777) is used to show prior art (col. 1, line 60; col. 5, line 23-26).

5. Mertol (US 5,834,839) is used to show prior art (col. 4, line 58-61).

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 1, 3-9, 11-16 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. It is unclear wherein the specification teaching of “forming an anti-etching layer on the top surface...and the die-cavity portion hermetically sealing the slot...”

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 1, 3-9, 11-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear and vague by the limitation “forming an anti-etching layer on the top surface...and the die-cavity portion hermetically sealing the slot...” The specification doesn’t describe or define what it is meant by hermetically sealing the slot.

Response to Arguments

10. Applicant's arguments filed 11/16/05 have been fully considered but they are not persuasive.

Applicant's argument that Kang doesn't teach forming an anti-etching layer on the top and bottom surface of the substrate and the die-cavity portion hermetically sealing the through slot is found unpersuasive because as shown in fig. 4 and 9, the metal layer is etched on the top surface and protected from being etched inside the slots. Also, fig. 9, col. 7, line 63-col. 8, line 5, shows the epoxy resin or dry film resist (this would read on claimed photosensitive dry film) is used for sealing the slots and as a mask for etching the metal layer on the top surface while protecting the metal inside the slot. Therefore, Kang does demonstrate that a photosensitive dry film is used and must be formed on the top and bottom and die-cavity portion hermetically sealing the through slots in order to etch the metal while protecting it inside the slot and provide the structure or package substrate as shown in fig. 4.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to DuyVu n. Deo whose telephone number is 571-272-1462. The examiner can normally be reached on 6:00-2:30 Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Primary Examiner

Duy-Vu N. Deo

1/26/06

